HEAD electronics P190201 Desksense Sensor Battery-Powered Device User Manual

Contents

Head Electronics P190201 Desksense Sensor Battery-Powered Device User Manual

Desksense
P190201, P190202, P190203

Introduction

An intelligent sensor solution to monitor desk occupancy.

The Desksense sensor is a battery-powered device designed to be long-lasting and easily deployable using LoRaWAN wireless networks. The device's intelligent software determines desk occupancy based on PIR sensor data.

Desksense's Intelligence allows you to operate the fleet of sensors at a low cost. The sensor transmits presence information instead of continuous motion data this transmission scheme reduces the time on the air. Therefore, power consumption is minimized resulting in a longer battery life. This also enables the sensor to require low storage bandwidth.

The built-in intelligence prevents false-positive errors enabling very precise desk occupancy sensing.

Smooth surface design prevents the user from bumping against the sensor. The streamlined shape of the sensor prevents it from being knocked off during usage.

The Desksense can be used in conjunction with a private LoRaWAN network and a custom backend. Therefore, there is no recuring fee or mandatory subscription.

Important information

Read this manual before attempting to install the device!

Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer, Head Electronics B.V. will not be held responsible for any loss or damage resulting from not following the instructions of operating manual.

Declaration of conformity

Hereby, the manufacturer declares that Desksense 2 complies with the essential requirements of RED (2014/53/EU). The full Declaration of Conformity can be requested at **info@head.nl**.

Compliance

The device is designed to be used in building monitoring systems and is complaint with safety and radio standards and legislation. Compliance has been formally evaluated by Notified Body Telefication B.V., with Notified Body number 0560 for use in Europe (EU), United States of America (USA), Canada (CAN) and India.

Power output and operating frequency

The device operates in a single frequency band using a non-detachable printed meandering monopole antenna for transmitting and receiving. The transmitter uses the long-range low power LoRa modulation (chirp) with a maximum transmission power of +14 dBm, the frequency band and data rate are determined by the operating region according to the LoRaWAN® Regional Parameters v1.0.3revA. The region is preconfigured at the factory and cannot be changed by the user. See “Ordering / variant information” for the operating frequency band for each region. It is important to order the correct variant matching the deployment region.

LoRaWAN

To use the device, it needs to be connected to a LoRaWAN network. The device is characterized as a class A device according to the LoRaWAN® Specification v1.0.3.

Batteries

The device is designed to operate on two standard non-rechargeable AA alkaline batteries (1.5V). Both batteries must be installed for the device to function.
Do not mix old and new batteries.
Do not mix different battery brands.
Make sure the batteries are installed in the correct orientation, the orientation is marked inside and next to the battery holders.
Preferably use high quality industrial type alkaline batteries for best performance. (example: PC1500 – PROCELL)

Environment

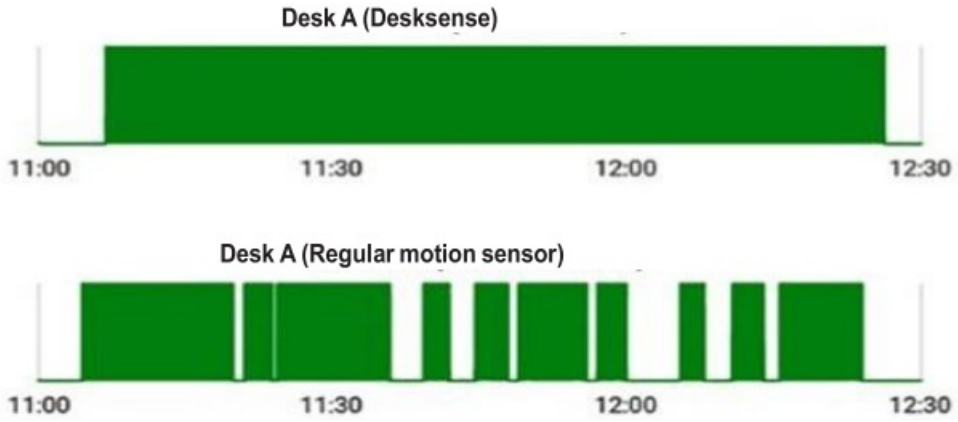
The device is designed to operate indoors.
Recommended temperature operating range is 0 C to 40 C.
Recommended humidity operating range is 10% to 60% RH.

Features

The main and only function of the Desksense is monitoring desk occupancy.

Occupancy

The main purpose of the device is to determine the occupancy state of a desk. This is different from “dump” motion sensors, these will transmit every time motion has been detected. The sensor determines and keeps track of the occupancy state of a desk, only transmitting when the occupancy state of a room has changed. This enables improved deep-sleep capabilities meaning that it uses only airtime when needed, thereby maximizing battery life.



Desksense presence data compared to regular motion sensor.

Battery powered

The device is battery powered and can last for multiple years. Unlike other long lasting low power LoRaWAN devices the Desksense uses standard AA alkaline batteries that are high performing, economical and can be easily sourced as compared to Lithium Thionyl Chloride [LTC] or Lithium Manganese Dioxide [LMD] batteries commonly found in other devices.

Over the Air (OTA) configurations

OTA configuration changes enable to optimize the sensor exactly to your needs e.g., presence sample size, LoRa credentials, heartbeat intervals and application switches can be modified Over The Air.

Remote Monitoring

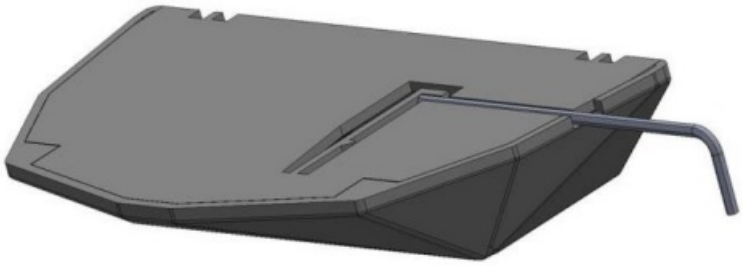
Sensor ID, sensor data, sensor type, battery level, software version, and heartbeat signals can be monitored remotely, which is key information for asset management.

General information

Battery replacement

The housing of the Desksense is design in such a way it cannot be easily opened by an unauthorized user.

When the sensor is mounted below a desk is can be opened for battery replacement by inserting a hex key to move the locking latch out of the way and sliding the housing forward.



Unlocking housing latch using 2 mm hex key.

Security

Every session is encrypted using a unique session key. Therefore, it prevents an attacker from gaining access to the network even if one device is compromised.

Every message includes a frame counter. This frame counter is used by the network to detect and prevent replay attacks and preventing the attacker from overloading the system.

The LoRa application credentials can be manually re-configured with custom credentials. Secondly, session keys are renewed every (default) 2000 messages. Every (default) 12 hours the sensor transmits a heartbeat message which needs to be acknowledged by the server. If this acknowledgement is absent for (default) three attempts, the sensor will perform a new join request, enabling the sensor to renew the session keys and always (try to) reconnect to the network.

Privacy

The passive infrared (PIR) sensor component only acts on motion sensing and does not recognize any person specifically nor register personal data.

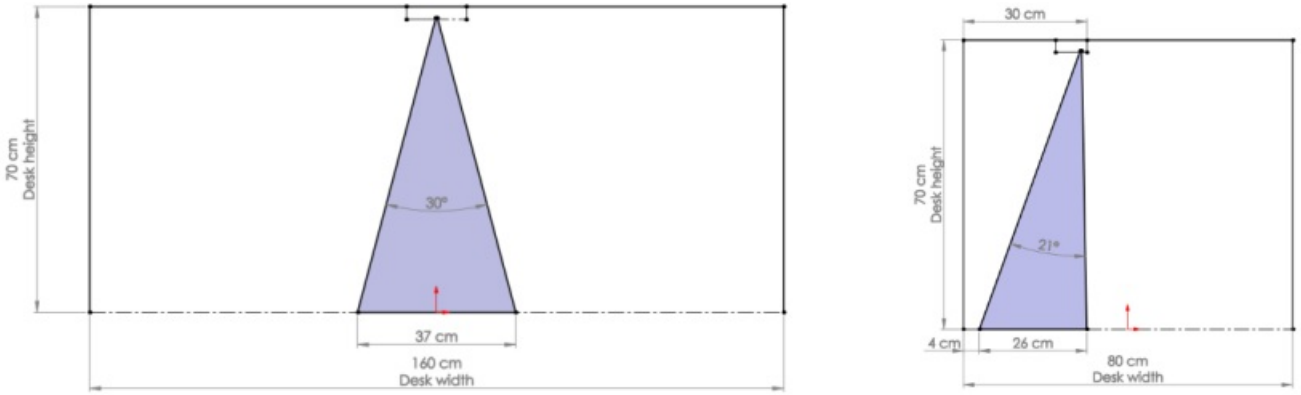
Detection Area

The detection area is determined by the installation high and temperature difference of the target. A special flat Fresnel lens and focus hole are used, creating 12 detection zones below the desk allowing the sensor to detect leg and feet movement below the desk allowing the sensor to determine the desk occupancy state. Note that the detection area changes depending on the installation high.

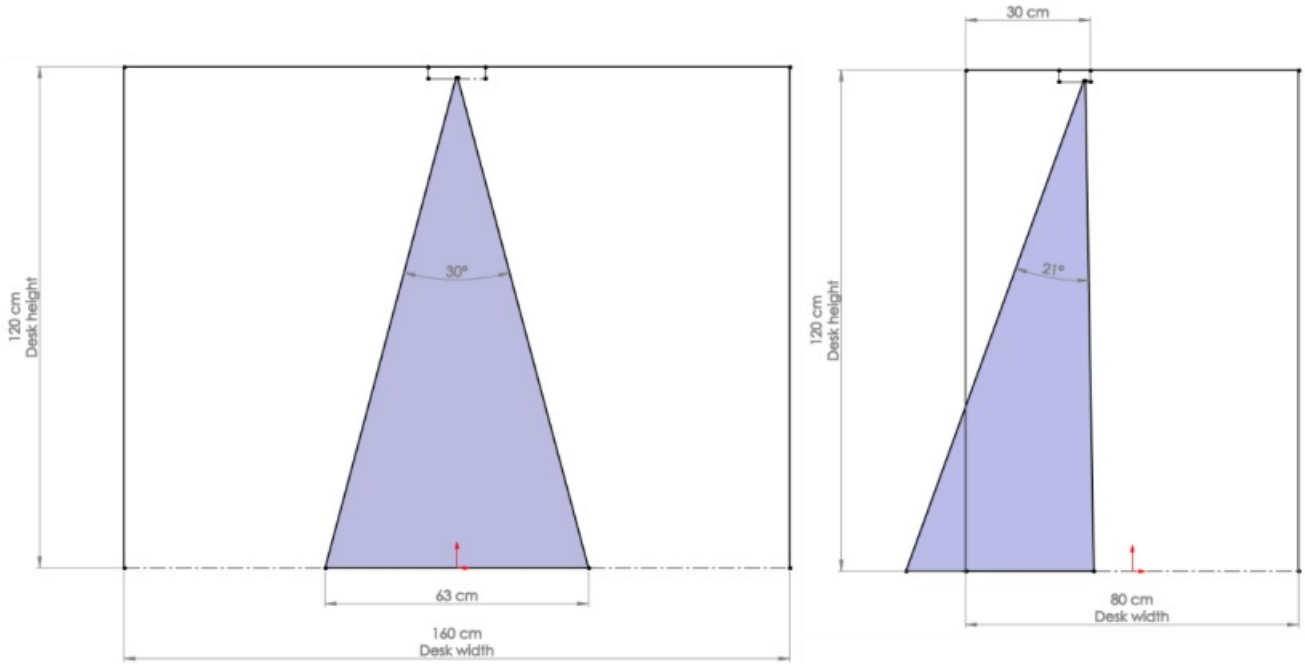
Detection area (standard desk)

Sitting and standing desks

The Desksense design is optimized for use with standard sitting desks ~70cm in height, mounted in the middle approximately 30 cm from the edge of a desk. However, the Desksense can also be used in with standing desks, this is due to the fact the detection area gets bigger when the installation height is increased. Thereby extending the detection area in front of the desk allowing the feet of the standing user to be detected. The figures below show theoretical detection areas at different installation heights. Please keep in mind these are theoretical values.



Sitting desk detection area.



Standing desk detection area.

Technical specifications

The table below list the main technical and sensor parameters.

LoRaWAN Class	Class A
Motion sensor detection angle	30° x 21°
Battery life *	>2 years
Operating voltage	2.2 - 3.6 VDC (~12 uA in deep sleep)
Frequency plan options	EU868, US915, IN865 (AU915, AS925).
Dimensions	138 x 76 x 29 mm
Processor	ARM Cortex-M0+ (32 MHz)
Weight	0.120 Kg (including batteries), 0.070 Kg (excluding batteries)

**Theoretical value based upon factory settings at room temperature.*

Ordering information

Make sure to order the correct model matching your deployment region. This is due to the fact LoRaWAN networks operate in different frequency bands depending on the region. The Desksense currently supports four different regions.

Model overview

The table below shows all currently available models. Every model can be uniquely identified by its “Model ID” and must be specified when ordering.

Model ID	Model name	Deployment Region	Frequency band
P190201	Desksense_EU	Europe	863-870 MHz
P190202	Desksense_USA	United States of America, Canada	902-928 MHz
P190203	Desksense_IN	India	865-867 MHz

Legal Note

Legal Note All information, including, but not limited to, information regarding the features, functionality, and/or other product specification are subject to change without notice. Head Electronics BV reserves all rights to revise or update its products, software, or documentation without any obligation to notify any individual or entity.
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Information contained in this publication regarding the product specifications is provided only for your reference and future updates may supersede this document. Head Electronics BV disclaims all liability arising from this information and the use of this document.

ISED Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

FCC statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Copyright statement

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Contact information

Desksense can receive assistance by contacting their local sales representatives or by contacting technical support at **info@head.nl**

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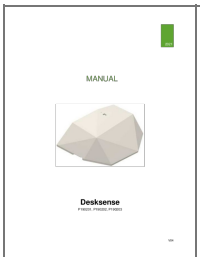
Documents / Resources

	**HEAD electronics P190201 Desksense Sensor Battery-Powered Device** [pdf] User Manual P190201, 2AXRUP190201, P190201 Desksense Sensor Battery-Powered Device, Desksense Sensor Battery-Powered Device, P190202, P190203

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